

LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA6 | South Ruislip to Ickenham

Data appendix (LQ-001-006)

Land quality

November 2013

LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA6 | South Ruislip to Ickenham

Data appendix (LQ-001-006)

Land quality

November 2013



Department
for Transport

High Speed Two (HS2) Limited has been tasked by the Department for Transport (DfT) with managing the delivery of a new national high speed rail network. It is a non-departmental public body wholly owned by the DfT.

A report prepared for High Speed Two (HS2) Limited.

High Speed Two (HS2) Limited,
Eland House,
Bressenden Place,
London SW1E 5DU

Details of how to obtain further copies are available from HS2 Ltd.

Telephone: 020 7944 4908

General email enquiries: HS2enquiries@hs2.org.uk

Website: www.hs2.org.uk

High Speed Two (HS2) Limited has actively considered the needs of blind and partially sighted people in accessing this document. The text will be made available in full on the HS2 website. The text may be freely downloaded and translated by individuals or organisations for conversion into other accessible formats. If you have other needs in this regard please contact High Speed Two (HS2) Limited.



Printed in Great Britain on paper
containing at least 75% recycled fibre.

Contents

1	Introduction	1
2	Engagement	2
3	Detailed risk assessment	3
3.1	Baseline risk assessment	5
3.2	Construction risk assessment	12
3.3	Post-construction risk assessment	19
3.4	Assessment of temporary (construction) and permanent (post-construction) effects	26
4	Inspections notes and other site data	32
5	Geological sites of special scientific interest and local geological sites	33
6	Mining and minerals data	34
7	References	35

List of tables

Table 1: Engagement on land quality issues undertaken for the study area	2
Table 2: Detailed risk assessment for areas potentially posing a contaminative risk within the study area	3
Table 3: Summary CSM for on-site unspecified works and depots, in the location of a proposed vent shaft at baseline (Area ref: 6-08/ 6-12/6-14/6-21)	5
Table 4: Summary CSM for on-site railway land overlying Secondary A aquifers/London Clay and the River Pinn at baseline (Area ref: 6-25)	6
Table 5: Summary CSM for off-site railway land adjacent the proposed West Ruislip vent shaft site at baseline (Area ref: 6-24)	7
Table 6: Summary CSM for an on-site agricultural research facility at baseline (Area ref: 6-26)	8
Table 7: Summary CSM for an off-site fuel station at baseline (Area ref: 6-22)	9
Table 8: Summary CSM for an historical landfill (New Years Farm) at baseline (Area ref: 6-27)	10
Table 9: Summary CSM for Newyears Green landfill at baseline (Area ref: 6-28)	11
Table 10: Summary CSM for on-site unspecified works and depots, in the location of a proposed vent shaft, during construction phase (Area ref: 6-08/ 6-12/6-14/6-21)	12
Table 11: Summary CSM for on-site railway land overlying Secondary A aquifers/London Clay and the River Pinn during construction phase (Area ref: 6-25)	13
Table 12: Summary CSM for on-site railway land adjacent the proposed West Ruislip vent shaft site during construction phase (Area ref: 6-24)	14
Table 13: Summary CSM for an on-site agricultural research facility during construction phase (Area ref: 6-26)	15
Table 14: Summary CSM for an off-site fuel station during construction phase (Area ref: 6-22)	16
Table 15: Summary CSM for an historical landfill (New Years Farm) during construction phase (Area ref: 6-27)	17
Table 16: Summary CSM for Newyears Green landfill during construction phase (Area ref: 6-28)	18
Table 17: Summary CSM for on-site unspecified works and depots, in the location of a proposed vent shaft, post-construction (Area ref: 6-08/ 6-12/6-14/6-21)	19
Table 18: Summary CSM for on-site railway land overlying Secondary A aquifers/London Clay and the River Pinn post-construction (Area ref: 6-25)	20
Table 19: Summary CSM for on-site railway land adjacent the proposed West Ruislip vent shaft site post-construction (Area ref: 6-24)	21
Table 20: Summary CSM for on-site agricultural research facility post-construction (Area ref: 6-26)	22
Table 21: Summary CSM for an off-site disused petrol station post-construction (Area ref: 6-22)	23
Table 22: Summary CSM for an historical landfill (New Years Farm) at post-construction (Area ref: 6-27)	24
Table 23: Summary CSM for Newyears Green landfill at post-construction (Area ref: 6-28)	25
Table 24: Significance of impact during construction/post construction for on-site unspecified works and depots, in the location of a proposed vent shaft (Area ref: 6-08/ 6-12/6-14/6-21)	26
Table 25: Significance of impact during construction/post construction for on-site railway land overlying Secondary A aquifers/London Clay (Area ref: 6-25)	27
Table 26: Significance of impact during construction/post construction for on-site railway land in location of a proposed vent shaft (Area ref: 6-24)	28
Table 27: Significance of impact during construction/post construction for an onsite agricultural research facility (Area ref: 6-26)	29

Table 28: Significance of impact during construction/post construction for an off-site petrol station (Area ref: 6-22)	30
Table 29: Significance of impact during construction/post construction for an historical landfill (New Years Farm) (Area ref: 6-27)	30
Table 30: Significance of impact during construction/post construction for the Newyears Green landfill (Area ref: 6-28)	31
Table 31: Review of ground investigations for areas located within the study area	32

1 Introduction

1.1.1 The land quality appendix for the South Ruislip to Ickenham community forum area (CFA6) comprises:

- a summary of engagement undertaken (Section 2);
- detailed risk assessment (Section 3);
- inspection notes and other site data (Section 4);
- geological sites of special scientific interest (SSSI) or regionally important geological sites (RIGS)(Section 5); and
- mining and minerals data (Section 6).

1.1.2 Maps referred to throughout the land quality appendix are contained Maps LQ-01-008, LQ-01-009, LQ-01-010, LQ-01-010-R1 and LQ-01-010-L1 in Volume 5, Land Quality Map Book.

2 Engagement

2.1.1 Table 1 sets out the local authorities and other organisations that have been engaged with during the preparation of the land quality section of the environmental impact assessment (EIA) for this study area, the types of information that have been provided to the assessment team and any specific concerns of those with whom the team engaged.

Table 1: Engagement on land quality issues undertaken for the study area

Local authority or other organisation	Method/dates of contact	Information provided and/or specific concerns
Environment Agency	Contact via email on: 24 April 2013; 15 May 2013; 24 May 2013; 12 June 2013; 14 June 2013; 27 June 2013; and 08 July 2013.	Although contacted there is no information available for this study area.
London Borough of Hillingdon (LBHi)	Contact via email on: 22 August 2013 Contact via telephone on: 23 August 2013.	Contact was made by email initially, followed by a telephone conversation with LBHi regarding Newyears Green landfill site. LBHi agreed to authorise the release of information pertaining to the landfill site, specifically groundwater, geophysical, water quality and ground profile data. This information was received from Atkins (the consultancy employed by LBHi) on 25 September 2013.
London Fire Brigade (LFB)	Contact via email on: 12 June 2013.	Contact was made by email initially, followed by telephone conversation with LFB regarding two sites that had been identified as potentially having petroleum storage facilities within their boundaries. A petroleum storage facility enquiry was directed to the LFB for the following two sites: - Former Braintree industrial estate, HA4 0XX - The Lodge, Glaxo Research Farm, Breakspear Road South, Uxbridge, Middlesex UB9 The LFB had no record of petroleum storage for either site.

3 Detailed risk assessment

3.1.1 This section presents assessments for the higher risk potentially contaminated sites within the study area. For each site the following data are presented:

- baseline risk assessment;
- construction risk assessment;
- post-construction risk assessment; and
- assessment of temporary (construction) and permanent (post-construction) effects.

3.1.2 This risk assessment incorporates the following assumptions:

- construction workers are not included within this assessment;
- sites that have been assessed as potentially posing a contaminative risk to the Proposed Scheme have been grouped and considered together where appropriate. It should be noted that some parcels of land may have had several land uses from different epochs;
- during construction standard mitigation procedures will be in place in accordance with the draft Code of Construction Practice (CoCP) (Volume 5: Appendix CT-003-000); and
- during the post-construction condition it is assumed that all required remediation has been undertaken and carried out.

3.1.3 The sites assessed in this study area are set out in Table 2 and are shown on Maps LQ-01-008, LQ-01-009, LQ-01-010, LQ-01-010-R1 and LQ-01-010-L1 (Volume 5, Land Quality Map Book).

Table 2: Detailed risk assessment for areas potentially posing a contaminative risk within the study area

Site reference	Land use	Table reference
6-08	Works building	3, 10, 17, 24
6-12	Works building	3, 10, 17, 24
6-21	Depots	3, 10, 17, 24
6-14	Works building	3, 10, 17, 24
6-25	Railway land	4, 11, 18, 25
6-24	Railway land	5, 12, 19, 26
6-26	Agricultural research facility	6, 13, 20, 27
6-22	Fuel station	7, 14, 21, 28
6-27	Historical landfill (New Years Farm)	8, 15, 22, 29
6-28	Newyears Green landfill	9, 16, 23, 23 ⁰

3.1.4 Contaminant types included within the risk assessments are based on the Priority Contaminants Report CLR 8¹. Although withdrawn, this report is still commonly used and is considered as good practice.

3.1.5 The remainder of this appendix presents the risk assessment for the sites set out in Table 2. The following abbreviations are used in these tables:

- CSM - conceptual site model;
- MTBE - methyl tertiary butyl ether;
- PCB - polychlorinated biphenyls;
- PAH - polycyclic aromatic hydrocarbons; and
- VOC - volatile organic compounds.

¹ Defra and Environment Agency, (2002), *Potential contaminants for the assessment of land- R&D Publication*, Bristol, Environment Agency.

3.1 Baseline risk assessment

Table 3: Summary CSM for on-site unspecified works and depots, in the location of a proposed vent shaft at baseline (Area ref: 6-08/ 6-12/6-14/6-21)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Contamination from on-going activities and in made ground – hydrocarbons including waste oils, heavy metals, PAH, PCB and asbestos	Site users - such as workers in businesses	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Unlikely	Medium	Low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas and railway areas	Off-site migration of soil vapours, volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
	Lambeth Group	Lateral and vertical migration of mobile contamination	Low likelihood	Minor	Low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Unlikely	Minor	Very low

Appendix LQ-001-006

Table 4: Summary CSM for on-site railway land overlying Secondary A aquifers/London Clay and the River Pinn at baseline (Area ref: 6-25)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Residual contamination in made ground (e.g. ballast): PCB, metals, asbestos, PAH and chlorinated hydrocarbons); potentially low levels of ground gas (methane and carbon dioxide) and VOC	Site users (rail staff)	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Unlikely	Medium	Low
		Exposure to asphyxiative or explosive gases	Unlikely	Severe	Moderate/low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas	Off-site migration of soil vapours, volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Low likelihood	Minor	Low
	River Pinn	Lateral and vertical migration of mobile contamination	Low likelihood	Minor	Low
	Secondary A aquifers (Alluvium and Lambeth Group)	Lateral and vertical migration of mobile contamination	Low likelihood	Minor	Low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Unlikely	Minor	Very low

Table 5: Summary CSM for off-site railway land adjacent the proposed West Ruislip vent shaft site at baseline (Area ref: 6-24)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Residual contamination in made ground (e.g. ballast): PCB, metals, asbestos, PAH and chlorinated hydrocarbons) potentially low levels of ground gas (methane and carbon dioxide) and VOC	Site users (rail staff)	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Unlikely	Medium	Low
		Exposure to asphyxiative or explosive gases	Unlikely	Severe	Moderate/low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas	Off-site migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Low likelihood	Minor	Low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Unlikely	Minor	Very low
		Migration of hazardous gas and vapours to confined spaces via permeable strata or conduits	Unlikely	Severe	Moderate/low

Appendix LQ-001-006

Table 6: Summary CSM for an on-site agricultural research facility at baseline (Area ref: 6-26)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Residual contamination from previous activities – oil/fuel hydrocarbons, acetones, pathogens, PAH, aromatic hydrocarbons, chlorinated hydrocarbons, PCB, cyanide, organotin compounds, heavy metals and semi-metals and asbestos	Site users - workers in businesses	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Low likelihood	Medium	Moderate/low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas and railway areas	Off-site migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Unlikely	Minor	Very low

Table 7: Summary CSM for an off-site fuel station at baseline (Area ref: 6-22)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Residual contamination from on-going activities: contaminants primarily comprising petroleum and diesel range hydrocarbons, methyl lead and MTBE	Site users - workers in businesses	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Unlikely	Medium	Low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas and railway areas	Off-site migration of soil vapours, volatile organic compounds (by diffusion or due to wind)	Low likelihood	Minor	Low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Low likelihood	Minor	Low

Appendix LQ-001-006

Table 8: Summary CSM for an historical landfill (New Years Farm) at baseline (Area ref: 6-27)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Residual contaminants could include, but are not limited to: heavy metals, organic compounds e.g. oils, asbestos, and ground gases (largely methane, carbon dioxide and VOC)	Site users - workers/residents on Newyears Green farm	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Low likelihood	Medium	Moderate/low
		Inhalation of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	Adjacent site users, such as those within residential properties to the east of the farm	Off-site migration of soil vapours, volatile organic compounds (by diffusion or due to wind)	Low likelihood	Medium	Moderate/low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
		Inhalation of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	Secondary A aquifers (Alluvium Lambeth group)	Lateral and vertical migration of mobile contamination	Likely	Medium	Moderate
	Principal Chalk aquifer	Lateral and vertical migration of mobile contamination	Likely	Severe	High
	On or off-site buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Unlikely	Minor	Very low
		Lateral migration and concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate

Table g: Summary CSM for Newyears Green landfill at baseline (Area ref: 6-28)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Residual contaminants could include, but are not limited to: heavy metals, organic compounds e.g. oils, asbestos, and ground gases (largely methane, carbon dioxide and VOC)	Site users - workers/residents on New Highway farm	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Low likelihood	Medium	Moderate/low
		Inhalation of asphyxiative or explosive gases	Likely	Severe	High
	Adjacent site users, such as those within residential properties to the east of the farm	Off-site migration of soil vapours, volatile organic compounds (by diffusion or due to wind)	Low likelihood	Medium	Moderate/low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
		Inhalation of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	Secondary A aquifers (Alluvium Lambeth group)	Lateral and vertical migration of mobile contamination	High likelihood	Medium	High
	Principal Chalk aquifer	Lateral and vertical migration of mobile contamination	High likelihood	Severe	Very high
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Low likelihood	Minor	Low
		Lateral migration and concentration of asphyxiative or explosive gases	Likely	Severe	High

3.2 Construction risk assessment

Table 10: Summary CSM for on-site unspecified works and depots, in the location of a proposed vent shaft, during construction phase (Area ref: 6-08/ 6-12/6-14/6-21)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction phase mitigation
Contamination from on-going activities and in made ground – hydrocarbons including waste oils, heavy metals, PAH, PCB and asbestos	Site users - workers in businesses	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Not present during construction		
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas and railway areas	Off-site migration of soil vapours, volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
	Lambeth Group	Lateral and vertical migration of mobile contaminants	Low likelihood	Minor	Low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Unlikely	Minor	Very low

Table 11: Summary CSM for on-site railway land overlying Secondary A aquifers/London Clay and the River Pinn during construction phase (Area ref: 6-25)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction phase mitigation
Residual contamination in made ground (e.g. ballast): PCB, metals, asbestos, PAH and chlorinated hydrocarbons); potentially low levels of ground gas (methane and carbon dioxide) and VOC	Site users (rail staff)	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Not present during construction		
		Exposure to asphyxiative or explosive gases	Not present during construction		
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas	Off-site migration of soil vapours, volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Low likelihood	Minor	Low
	River Pinn	Lateral and vertical migration of mobile contamination	Low likelihood	Minor	Low
	Secondary A aquifers (Alluvium and Lambeth Group)	Lateral and vertical migration of mobile contamination	Low likelihood	Minor	Low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Unlikely	Minor	Very low

Table 12: Summary CSM for on-site railway land adjacent the proposed West Ruislip vent shaft site during construction phase (Area ref: 6-24)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction phase mitigation
Residual contamination in made ground (e.g. ballast): PCB, metals, asbestos, PAH and chlorinated hydrocarbons) potentially low levels of ground gas (methane and carbon dioxide) and VOC	Site users (rail staff)	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Not present during construction		
		Exposure to asphyxiative or explosive gases	Not present during construction		
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas	Off-site migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Low likelihood	Minor	Low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Unlikely	Minor	Very low
		Migration of hazardous gas and vapours to confined spaces via permeable strata or conduits	Unlikely	Severe	Moderate/low

Table 13: Summary CSM for an on-site agricultural research facility during construction phase (Area ref: 6-26)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction phase mitigation
Residual contamination from previous activities – oil/fuel hydrocarbons, acetones, pathogens, PAH, aromatic hydrocarbons, chlorinated hydrocarbons, PCB, cyanide, organotin compounds, heavy metals and semi-metals and asbestos	Site users - workers in businesses	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Low likelihood	Medium	Moderate/low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas and railway areas	Off-site migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Unlikely	Minor	Very low

Appendix LQ-001-006

Table 14: Summary CSM for an off-site fuel station during construction phase (Area ref: 6-22)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction phase mitigation
Residual contamination from former and on-going activities: contaminants primarily comprising petroleum and diesel range hydrocarbons, methyl lead and MTBE	Site users - workers in businesses	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Low likelihood	Medium	Moderate/low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas and railway areas	Off-site migration of soil vapours, volatile organic compounds (by diffusion or due to wind)	Low likelihood	Minor	Low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Low likelihood	Minor	Low

Table 15: Summary CSM for an historical landfill (New Years Farm) during construction phase (Area ref: 6-27)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction phase mitigation
Residual contaminants could include, but are not limited to: heavy metals, organic compounds e.g. oils, asbestos, and ground gases (largely methane, carbon dioxide and VOC)	Site users - workers/residents on Newyears farm	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Low likelihood	Medium	Moderate/low
		Inhalation of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	Adjacent site users, such as those within residential properties to the east of the farm	Off-site migration of soil vapours, volatile organic compounds (by diffusion or due to wind)	Low likelihood	Medium	Moderate/low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
		Inhalation of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	Secondary A aquifers (Alluvium Lambeth group)	Lateral and vertical migration of mobile contamination	Likely	Medium	Moderate
	Principal Chalk aquifer	Lateral and vertical migration of mobile contamination	Likely	Severe	High
	On or off-site buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Unlikely	Minor	Very low
		Lateral migration and concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate

Table 16: Summary CSM for Newyears Green landfill during construction phase (Area ref: 6-28)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction phase mitigation
Residual contaminants could include, but are not limited to: heavy metals, organic compounds e.g. oils, asbestos, and ground gases (largely methane, carbon dioxide and VOC)	Site users - workers/residents on New Highway	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Low likelihood	Medium	Moderate/low
		Inhalation of asphyxiative or explosive gases	Likely	Severe	High
	Adjacent site users, such as those within residential properties to the east of the farm	Off-site migration of soil vapours, volatile organic compounds (by diffusion or due to wind)	Low likelihood	Medium	Moderate/low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
		Inhalation of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	Secondary A aquifers (Alluvium Lambeth group)	Lateral and vertical migration of mobile contamination	High likelihood	Medium	High
	Principal Chalk aquifer	Lateral and vertical migration of mobile contamination	High likelihood	Severe	Very high
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Low likelihood	Minor	Low
		Lateral migration and concentration of asphyxiative or explosive gases	Likely	Severe	High

3.3 Post-construction risk assessment

Table 17: Summary CSM for on-site unspecified works and depots, in the location of a proposed vent shaft, post-construction (Area ref: 6-08/ 6-12/6-14/6-21)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Contamination from on-going activities and in made ground – hydrocarbons including waste oils, heavy metals, PAH, PCB and asbestos	Future site users - e.g. workers	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Unlikely	Minor	Very low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas and railway areas	Off-site migration of soil vapours, volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
	Lambeth group	Lateral and vertical migration of mobile contaminants	Unlikely	Minor	Very low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Unlikely	Minor	Very low

Appendix LQ-001-006

Table 18: Summary CSM for on-site railway land overlying Secondary A aquifers/London Clay and the River Pinn post-construction (Area ref: 6-25)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual contamination in made ground (e.g. ballast): PCB, metals, asbestos, PAH and chlorinated hydrocarbons); potentially low levels of ground gas (methane and carbon dioxide) and VOC	Future site users (rail staff)	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Unlikely	Minor	Very low
		Exposure to asphyxiative or explosive gases	Unlikely	Severe	Moderate/low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas	Off-site migration of soil vapours, volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
	River Pinn	Lateral and vertical migration of mobile contamination	Unlikely	Minor	Very low
	Secondary A aquifers (Alluvium and Lambeth group)	Lateral and vertical migration of mobile contamination	Unlikely	Minor	Very low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Unlikely	Minor	Very low

Table 19: Summary CSM for on-site railway land adjacent the proposed West Ruislip vent shaft site post-construction (Area ref: 6-24)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual contamination in made ground (e.g. ballast): PCB, metals, asbestos, PAH and chlorinated hydrocarbons) potentially low levels of ground gas (methane and carbon dioxide) and VOC	Future site users (rail staff)	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Unlikely	Minor	Very low
		Exposure to asphyxiative or explosive gases	Unlikely	Severe	Moderate/low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas	Off-site migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Unlikely	Minor	Very low
		Migration of hazardous gas and vapours to confined spaces via permeable strata or conduits	Unlikely	Severe	Moderate/low

Appendix LQ-001-006

Table 20: Summary CSM for on-site agricultural research facility post-construction (Area ref: 6-26)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual contamination from previous activities – oil/fuel hydrocarbons, acetones, pathogens, PAH, aromatic hydrocarbons, chlorinated hydrocarbons, PCB, cyanide, organotin compounds, heavy metals and semi-metals and asbestos	Future site users - e.g. workers	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Unlikely	Minor	Very low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas and railway areas	Off-site migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Unlikely	Minor	Very low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Unlikely	Minor	Very low

Table 21: Summary CSM for an off-site disused petrol station post-construction (Area ref: 6-22)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual contamination from former and on-going activities: contaminants primarily comprising petroleum and diesel range hydrocarbons, methyl lead and MTBE	Future site users - e.g. workers	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Low likelihood	Minor	Low
	Adjacent site users, such as those within residential properties and workers in the surrounding light industrial/residential areas and railway areas	Off-site migration of soil vapours, volatile organic compounds (by diffusion or due to wind)	Low likelihood	Minor	Low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Low likelihood	Minor	Low

Appendix LQ-001-006

Table 22: Summary CSM for an historical landfill (New Years Farm) at post-construction (Area ref: 6-27)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual contaminants could include, but are not limited to: heavy metals, organic compounds e.g. oils, asbestos, and ground gases (largely methane, carbon dioxide and VOC)	Site users - workers/residents on Newyears Green farm	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Low likelihood	Medium	Moderate/low
		Inhalation of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	Adjacent site users, such as those within residential properties to the east of the farm	Off-site migration of soil vapours, volatile organic compounds (by diffusion or due to wind)	Low likelihood	Medium	Moderate/low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
		Inhalation of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	Secondary A aquifers (Alluvium and Lambeth group)	Lateral and vertical migration of mobile contamination	Likely	Medium	Moderate
	Principal Chalk aquifer	Lateral and vertical migration of mobile contamination	Likely	Severe	High
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Unlikely	Minor	Very low
		Lateral migration and concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate

Table 23: Summary CSM for Newyears Green landfill at post-construction (Area ref: 6-28)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual contaminants could include, but are not limited to: heavy metals, organic compounds e.g. oils, asbestos, and ground gases (largely methane, carbon dioxide and VOC)	Site users - workers/residents on New Highway farm	Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Low likelihood	Medium	Moderate/low
		Inhalation of asphyxiative or explosive gases	Likely	Severe	High
	Adjacent site users, such as those within residential properties to the east of the farm	Off-site migration of soil vapours, volatile organic compounds (by diffusion or due to wind)	Low likelihood	Medium	Moderate/low
		Off-site migration of wind-blown dust	Unlikely	Minor	Very low
		Inhalation of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	Secondary A aquifers (Alluvium and Lambeth Group)	Lateral and vertical migration of mobile contamination	High likelihood	Medium	High
	Principal Chalk aquifer	Lateral and vertical migration of mobile contamination	High likelihood	Severe	Very high
	Buildings/underground structures and services	Direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Low likelihood	Minor	Low
		Lateral migration and concentration of asphyxiative or explosive gases	Likely	Severe	High

3.4 Assessment of temporary (construction) and permanent (post-construction) effects

Table 24: Significance of impact during construction/post construction for on-site unspecified works and depots, in the location of a proposed vent shaft (Area ref: 6-08/ 6-12/6-14/6-21)

Contaminant linkage	Baseline	Construction	Post-construction	Construction effects	Post-construction effects
Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Low	N/A	Very low	Negligible	Minor beneficial
Off-site migration of soil vapours, volatile organic compounds (by diffusion or due to wind)	Very low	Very low	Very low	Negligible	Negligible
Off-site migration of wind-blown dust	Very low	Very low	Very low	Negligible	Negligible
Lateral and vertical migration of mobile contamination into the Lambeth Group	Low	Low	Very low	Negligible	Minor beneficial
Migration of contamination and direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Very low	Very low	Very low	Negligible	Negligible
Overall significance				Negligible effect	Negligible to minor beneficial effect

Table 25: Significance of impact during construction/post construction for on-site railway land overlying Secondary A aquifers/London Clay (Area ref: 6-25)

Contaminant linkage	Baseline	Construction	Post-construction	Construction effects	Post-construction effects
Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Low	N/A	Very low	Negligible	Minor beneficial
Exposure to asphyxiative or explosive gases	Moderate/low	N/A	Moderate/low	Negligible	Negligible
Off-site migration of soil vapours, volatile organic compounds (by diffusion or due to wind)	Very low	Very low	Very low	Negligible	Negligible
Off-site migration of wind-blown dust	Low	Low	Very low	Negligible	Minor beneficial
Lateral and vertical migration of mobile contamination into the River Pinn	Low	Low	Very low	Negligible	Minor beneficial
Lateral and vertical migration of mobile contamination into the underlying Secondary A aquifers (Alluvium and Lambeth Group)	Low	Low	Very low	Negligible	Minor beneficial
Migration of contamination and direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Very low	Very low	Very low	Negligible	Negligible
Overall significance				Negligible effect	Negligible to minor beneficial effect

Appendix LQ-001-006

Table 26: Significance of impact during construction/post construction for on-site railway land in location of a proposed vent shaft (Area ref: 6-24)

Contaminant linkage	Baseline	Construction	Post-construction	Construction effects	Post-construction effects
Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Low	N/A	Very low	Negligible	Minor beneficial
Exposure to asphyxiative or explosive gases	Moderate/low	N/A	Moderate/low	Negligible	Negligible
Exposure of adjacent site users to contaminated vapours and/or volatile organic compounds	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent site users to contaminated dust	Low	Low	Very low	Negligible	Minor beneficial
Migration of hazardous gas and vapours to confined spaces via permeable strata or conduits	Moderate/low	Moderate/low	Low	Negligible	Minor beneficial
Migration of contamination and direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Very low	Very low	Very low	Negligible	Negligible
Overall significance				Negligible effect	Negligible to minor beneficial effect

Table 27: Significance of impact during construction/post construction for an onsite agricultural research facility (Area ref: 6-26)

Contaminant linkage	Baseline	Construction	Post-construction	Construction effects	Post-construction effects
Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Moderate/low	N/A	Very low	Negligible	Moderate beneficial
Exposure of adjacent site users to contaminated vapours and/or volatile organic compounds	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent site users to contaminated dust	Very low	Very low	Very low	Negligible	Negligible
Migration of contamination and direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Very low	Very low	Very low	Negligible	Negligible
Overall significance				Negligible effect	Negligible to moderate beneficial effect

Appendix LQ-001-006

Table 28: Significance of impact during construction/post construction for an off-site petrol station (Area ref: 6-22)

Contaminant linkage	Baseline	Construction	Post-construction	Construction effects	Post-construction effects
Human uptake of contaminants via dermal/ingestion/inhalation for existing site staff	Low	Low	Low	Negligible	Negligible
Off-site migration of soil vapours, volatile organic compounds (by diffusion or due to wind)	Low	Low	Low	Negligible	Negligible
Off-site migration of wind-blown dust	Very low	Very low	Very low	Negligible	Negligible
Migration of contamination and direct contact with buildings receptors including foundations and services	Low	Low	Low	Negligible	Negligible
Overall significance				Negligible effect	Negligible effect

Table 29: Significance of impact during construction/post construction for an historical landfill (New Years Farm) (Area ref: 6-27)

Contaminant Linkage	Baseline	Construction	Post-construction	Construction effects	Post-construction effects
Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Exposure to asphyxiative or explosive gases	Moderate	Moderate	Moderate	Negligible	Negligible
Off-site migration of soil vapours, volatile organic compounds (by diffusion or due to wind)	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Off-site migration of wind-blown dust	Very low	Very low	Very low	Negligible	Negligible
Lateral and vertical migration of mobile contamination into the River Pinn	High	High	High	Negligible	Negligible
Lateral and vertical migration of mobile contamination into the underlying Secondary A aquifers (Alluvium and Lambeth Group)	High	High	High	Negligible	Negligible
Migration of contamination and direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Low	Low	Low	Negligible	Negligible

Overall Significance		Negligible effect	Negligible effect
----------------------	--	-------------------	-------------------

Table 30: Significance of impact during construction/post construction for the Newyears Green landfill (Area ref: 6-28)

Contaminant linkage	Baseline	Construction	Post-construction	Construction effects	Post-construction effects
Human uptake through: dermal contact, ingestion or inhalation of soil/dust, volatilised compounds	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Exposure to asphyxiative or explosive gases	High	High	High	Negligible	Negligible
Off-site migration of soil vapours, volatile organic compounds (by diffusion or due to wind)	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Off-site migration of wind-blown dust	Very low	Very low	Very low	Negligible	Negligible
Lateral and vertical migration of mobile contamination into the River Pinn	Very high	Very high	Very high	Negligible	Negligible
Lateral and vertical migration of mobile contamination into the underlying Secondary A aquifers (Alluvium and Lambeth Group)	Very high	Very high	Very high	Negligible	Negligible
Migration of contamination and direct contact of fabric of buildings and services (e.g. foundations and water supply pipes)	Low	Low	Low	Negligible	Negligible
Overall significance				Negligible effect	Negligible effect

4 Inspections notes and other site data

4.1.1 This section presents the following data:

- site inspection notes for those key potentially contaminated sites visited during the study period;
- names of ground investigation or contamination survey reports reviewed during the study period, obtained from the Hillingdon Planning Portal; and
- any other relevant site data.

4.1.2 The remainder of this appendix presents other data obtained within this study area.

Table 31: Review of ground investigations for areas located within the study area

Local authority area	Description of report (Phase 1, phase 2, validation/ remediation etc.)	Report date	Name of originator	Address of area	Type of scheme, e.g. residential/ commercial development	Planning application reference number
London Borough of Hillingdon	Contamination Assessment	Feb-11	Lionhead Construction Ltd	85 Great Central Avenue	Planning permission 64730/APP/2010/855 Dated 23/07/2010- Two storey detached building comprising two one- bedroom flats with habitable roof space, associated amenity space, parking and installation of two vehicular crossovers, involving demolition of existing detached building	64730/APP/2011/332
London Borough of Hillingdon	Contamination Assessment	Feb-10	Atkins	Northolt Junction	Construction of additional line at Northolt Junction	66712/APP/2010/103
London Borough of Hillingdon	Ground investigation	Oct-08	Norwest Holst Ltd	Northolt Aerodrome	New buildings	189APP20101167
London Borough of Hillingdon	GI letter, Northolt Ltd	May-10	Aecom	Northolt Aerodrome	As above	189APP20101167

5 Geological sites of special scientific interest and local geological sites

5.1.1 There are no geo-conservation resources identified within the study area.

6 Mining and minerals data

- 6.1.1 There are no mining or mineral extraction sites within the study area. There are no minerals safeguarding areas or planned extraction sites indicated to be present within the study area by the minerals planning authority.

7 References

Defra and Environment Agency, (2002), *Potential contaminants for the assessment of land- R&D Publication*, Bristol, Environment Agency.